IN THE DRAWINGS

Applicant submits herewith a proposed replacement drawing sheet showing revised Figs. 10 and 21. Replacement Sheets including revised Figs. 10 and 21 are included as attachments, as are Annotated Sheets showing in detail the change made.

REMARKS

Claims Rejections Under 35 U.S.C. §102

Claims 12-13, 15, 19, 21-22 and 24-25 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,909,136 issued to Kimura ("Kimura"). Applicant traverses this rejection.

Claim 12 recites a squaring cell having two sub-exponential current generators. A sub-exponential current generator differs from a true exponential current generator in that it produces a current having an output function that is deliberately "softened" to result in an output that deviates from an ideal exponential function. (Page 19, lines 12-16.) Purposely softening the exponential functions of the current generators may cause the combined output to more closely approximate an ideal square law. (Page 19, lines 16-18.)

The Examiner argues that Kimura discloses sub-exponential current generators because the exponential function set forth in equation 17 (col. 8, line 18) is based on an approximation. Specifically, the Examiner points to Kimura's assumption, while deriving equation 17, that the DC common-base current gain factor α_F for a transistor is equal to 1, when in practice, α_F is typically equal to 0.98-0.99 for a transistor made with ordinary semiconductor device manufacturing processes. (Col. 8, lines 3-6.)

However, the Examiner has failed to show how, if at all, this approximation affects the exponential relationship. There is no argument or evidence as to whether an α_F that is not unity (not equal to one) would soften the exponential function (which *would* create a sub-exponential function), sharpen the exponential function (which would create something that might be deemed a super-exponential function rather than sub-exponential), have some other effect, or have no effect at all.

In essence, the Examiner is arguing that Kimura inherently discloses a sub-exponential current generator. But in relying upon a theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. MPEP 2112. Since the Examiner has not shown how a sub-exponential current generator necessarily flows from the teachings of Kimura, the rejection of claim 12 is not properly supported.

In response to Applicant's arguments filed in the Appeal Brief, the Examiner alleges that Kimura teaches that the transistors used in the exponential current generators do not have exactly the same geometry, and therefore, the current generators do not generate ideal exponential functions. This assertion, however, is directly contrary to Kimura's explicit

statement that the transistors have matching characteristics. ("The characteristics of transistors Q1-Q4 are essentially identical." Column 6, lines 57-58. See also column 7, lines 39-40 and column 7, lines 62-63.)

Even assuming, for the sake of argument, that the transistors are not perfectly matched, the Examiner has once again failed to establish how, if at all, this would affect the exponential relationship.

For at least these reasons, claim 12 is not anticipated by Kimura. Likewise, the rejection of claims 13, 15, 19, 21-22 and 24-25 under U.S.C. §102 is unfounded.

Claims Rejections Under 35 U.S.C. §103

Claims 17 and 26 are rejected under 35 U.S.C. §102(a) as being unpatentable over Kimura in view of U.S. Patent No. 6,173,346 issued to Wallach, et al. ("Wallach"). Applicant traverses this rejection.

Claim 17 recites scaling the first and second currents while generating and combining the first and second currents. In other words, the scaling is performed while the circuit is in operation. In the embodiment of Fig. 20, scaling may be accomplished by varying the bias currents I_0 in response to a control signal as explained in the specification at page 20, lines 24-27. The specification further discloses at page 20, lines 25-28 that scaling the first and second currents while the circuit is in operation may provide the benefit of allowing squaring and weighting functions to be performed simultaneously, e.g., by using a weighting signal as the control signal.

Kimura discloses varying certain bias signals by programming them in a manner that would have the effect of scaling the first and second currents. (Col. 8, lines 57-58.) However, the Examiner acknowledges that Kimura does not disclose scaling the bias signals while the circuit is in operation. Kimura only mentions that programming the bias signals allows for easy circuit design and integration in large scale integration (LSI). (Col. 8, lines 58-62.)

From this, the Examiner makes the analytical leap that it would have been obvious to perform the scaling operation while the circuit is in operation because it would be desirable to do so because the circuit does not need to be powered down. In support of this leap, the Examiner cites Wallach as teaching the desirability of adding or replacing the functionality of a circuit using programming without powering down the system. There are several problems with this argument.

First, Wallach is not pertinent art. Claim 17 recites a method which, in view of the specification, is directed to the realm of analog signal processing. The specification discusses numerous embodiments of transistor-level circuits in terms of signals, currents, squaring, multiplying, etc., as analog concepts. In contrast, Wallach relates to "I/O adaptors in computer systems" (col. 5, lines 40-41) which are digital systems. Thus, Wallach would not be considered reasonably pertinent to the particular problem with which the inventor was involved.

Second, as best understood by Applicant, the Examiner's arguments regarding not needing to "power down the system" seem to contemplate a notion of discrete operating modes where the system switches between different fixed operating parameters. However, as disclosed in Applicant's specification, scaling the currents while the circuit is in operation may enable not just a change in modes, but rather the integration of two functions into one operation, e.g., allowing squaring and weighting functions to be performed simultaneously. None of the cited references provide the suggestion or motivation for such a modification to the prior art.

Third, claim 17 recites scaling the first and second currents responsive to a control signal. In one embodiment, such a control signal may be a weighting signal as discussed above. The examiner alleges that Kimura discloses a current source I_0 that can be scaled in response to a control signal, but identifies no such control signal, nor any suggestion or motivation to scale anything in response to a control signal. Kimura teaches that I_0 is a constant current source (col. 8, line 23), and at most may be a programmable parameter (col. 8, line 59) which allows easy circuit design and is suitable for LSI. But these teachings relate to varying parameters at the time the circuit is designed and manufactured, not while it is operating, and not in response to a control signal.

Finally, not only is the combination of Kimura and Wallach untenable, but it is based on an impermissible hindsight reconstruction using the Applicant's disclosure as a roadmap to achieve the claimed invention. The Examiner has not identified any motivation or suggestion in Kimura, Wallach, or any other reference, to scale sub-exponential currents while the circuit is in operation. Thus, a prima facie case of obviousness has not been established for claim 17. Similar reasoning applies to the rejection of claim 26.

Allowable Subject Matter

Claims 14, 16, 18, 20, 23 and 27 are objected to as being dependent upon rejected base claims. Applicant traverses this rejection in view of the foregoing arguments and allowability of the base claims.

Allowed Claims

Claims 28-31 are allowed.

New Claims

New claims 32-36 are added.

Conclusion

Applicant requests reconsideration in view of the foregoing amendments and remarks. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

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Annotated Sheet Showing Changes

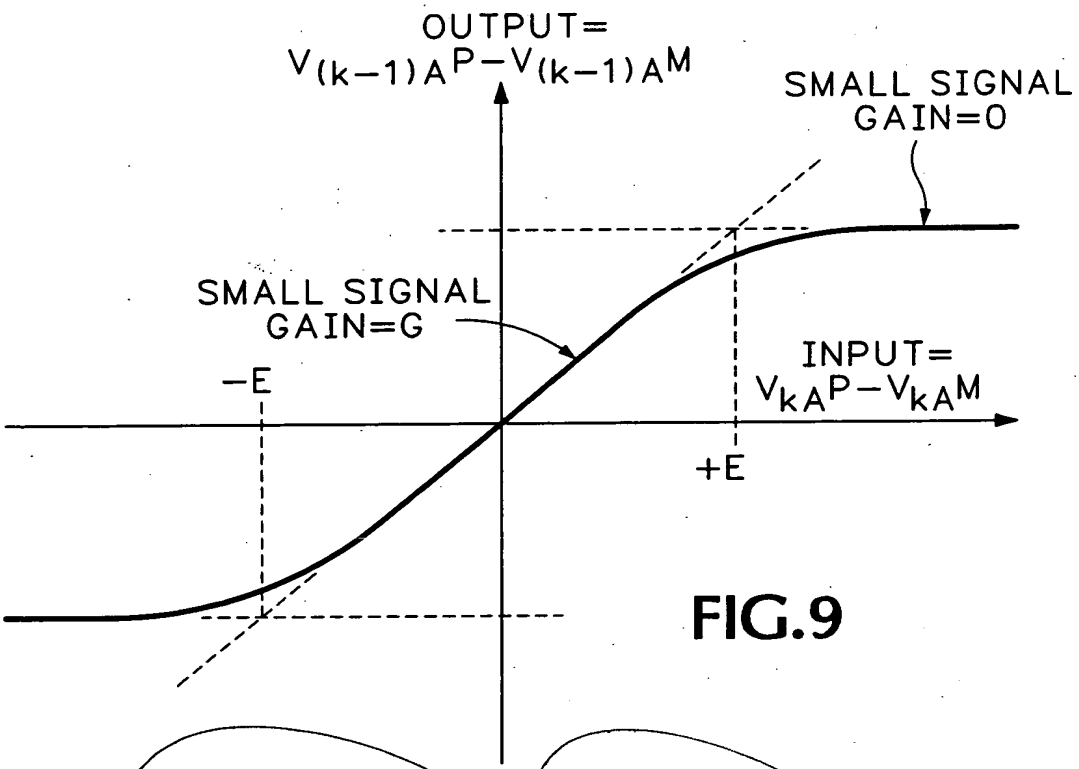

FIG.9

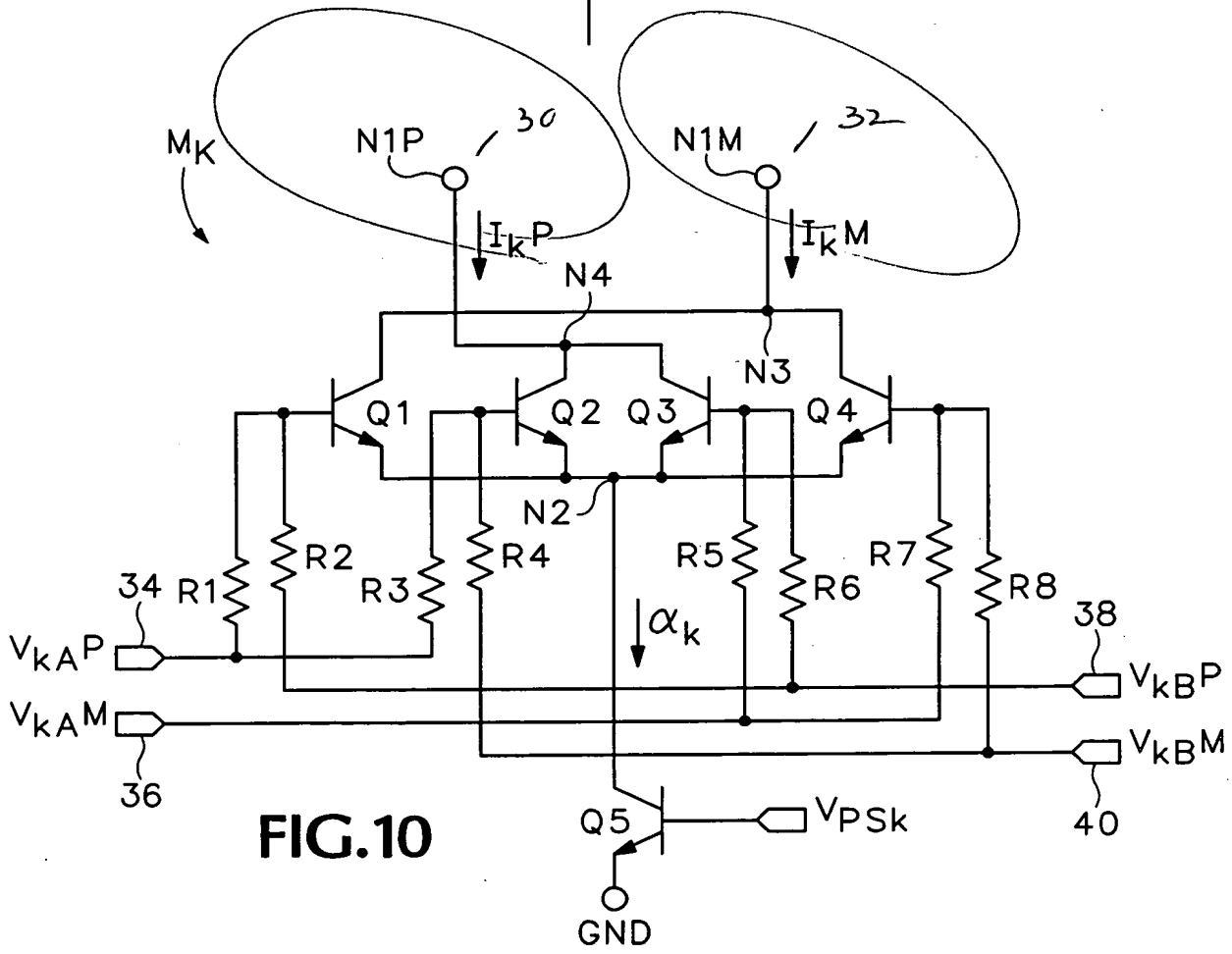

FIG.10

Annotated Sheet Showing Changes

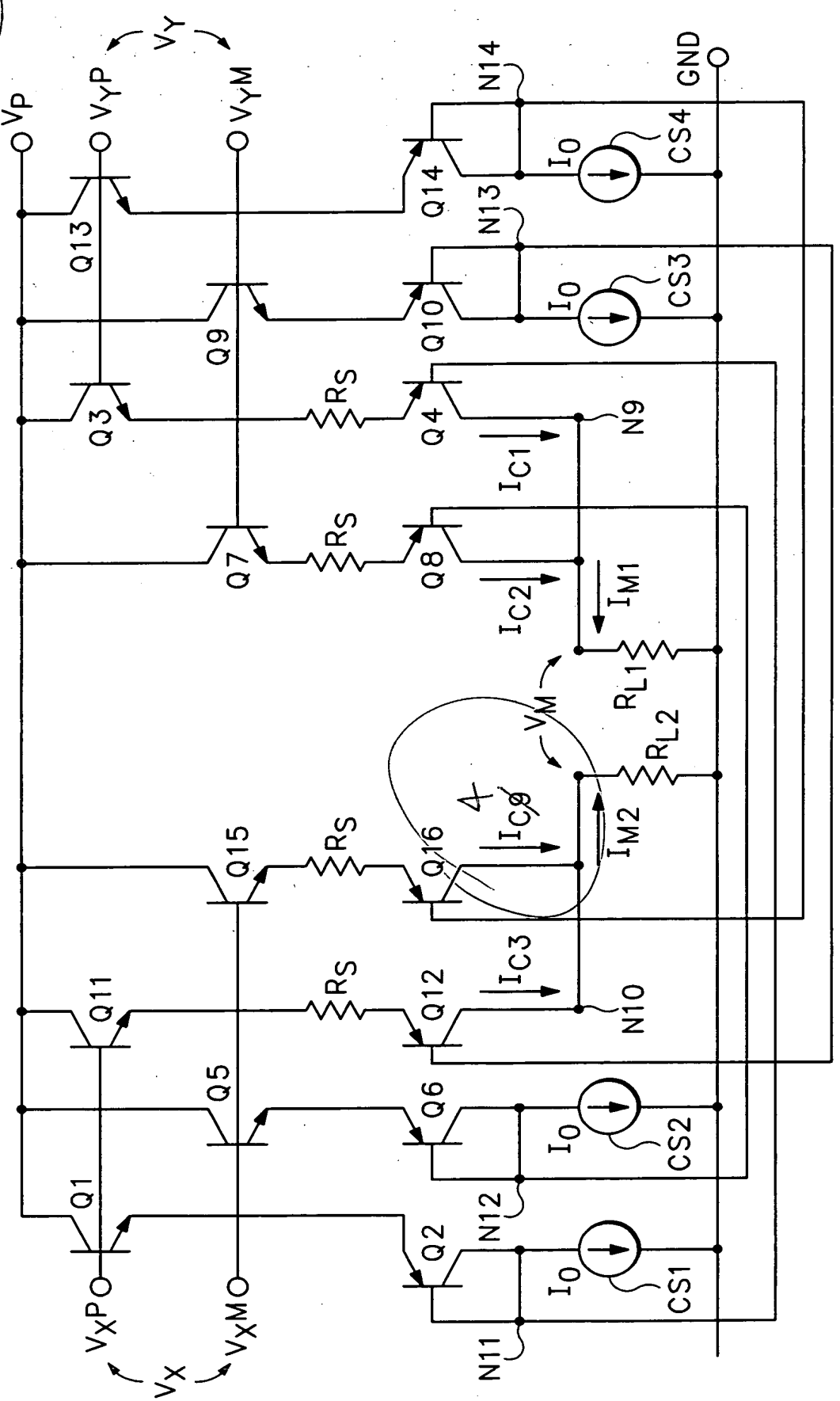

FIG.21